

CAPITAL FORMATION AND UNEMPLOYMENT IN NIGERIA (1985–2024): EVIDENCE FROM ARDL APPROACH

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ABSTRACT: This study empirically appraised the effect of capital formation on unemployment in Nigeria from 1986 to 2024. The study utilised annual time series data from the National Bureau of Statistics (NBS) and the World Development Indicators (WDI) of the World Bank. The data analysis techniques adopted comprise the Autoregressive Distributed Lag (ARDL) approach, bounds cointegration test, and ADF unit root test. The study found that the unemployment rate in Nigeria is significantly diminished by gross fixed capital formation and net fixed capital formation, while national saving has a negative and non-significant impact on the unemployment rate. The study concluded that capital formation plays a significant role in reducing unemployment in Nigeria. The implication of this is that policies aimed at promoting capital accumulation can serve as effective tools for unemployment reduction. It shows that capital formation is not only enhancing output (GDP) but also translating into inclusive growth by creating jobs. Therefore, the government should prioritise and increase investments in critical infrastructure projects, including energy generation (power plants), industrial zones, and transportation networks (roads, railways, ports). These investments should concentrate on high-impact sectors that generate considerable employment opportunities and stimulate economic activity.

Keywords: Capital Formation, Unemployment, Gross Fixed Capital Formation, Net Fixed Capital Formation, National Saving

INTRODUCTION

Without a more thorough examination of the role of capital formation in Nigeria's economic development, it is impossible to conduct a comprehensive analysis of the country's growth rate. This is done with the knowledge that capital formation is a key component in gauging the expansion of the Nigerian economy. According to Onwiodiokit and Otolorin (2021), capital formation is a crucial driver of economic development and employment generation. It encompasses the accumulation of physical, financial, human, and social capital, which together facilitate production, investment, and consumption activities in an economy, leading to reduction in unemployment. In Nigeria, where unemployment remains one of the most pressing socio-economic challenges, capital formation has become a key policy focus for stimulating job creation and enhancing labour market performance. Theoretically, increased capital formation leads to higher productivity, expansion of industrial capacity, and the development of new enterprises, all of which can reduce unemployment by generating more employment opportunities (Jhingan, 2016). Over the years, Nigeria has witnessed varying levels of investment, especially in public infrastructure, telecommunications, and industrial development. The government and private

sector have made considerable efforts to boost capital accumulation through policy reforms, budgetary allocations, and foreign direct investment (FDI) inflows. Empirical studies have shown that in economies where capital formation is sustained and efficiently utilized, unemployment tends to decline significantly as new investments absorb idle labour and increase the demand for skilled and unskilled workers (Bakare, 2011; Adebayo & Ogunrinola, 2020). This suggests that capital formation, if well-coordinated, can serve as a powerful instrument for addressing Nigeria's unemployment crisis.

Furthermore, capital formation plays a critical role in driving economic activity and employment creation, especially in developing countries like Nigeria. When investments are made in physical infrastructure such as roads, power supply, factories, and equipment, it leads to increased productive capacity of the economy. This expansion results in a higher demand for labor to operate machinery, manage facilities, and provide supporting services, thereby reducing the unemployment rate (Barro, 2021). According to Adebayo and Ogunrinola (2020), capital formation significantly contributes to job creation in Nigeria, as the establishment of new enterprises and the expansion of existing industries often require additional workforce, thus absorbing a portion of the unemployed population. Moreover, capital formation encourages both public and private sector investment, which directly and indirectly leads to employment generation. For example, when the government invests in construction and infrastructure projects, it creates direct jobs in the construction sector and indirect jobs in the supply of materials, logistics, and maintenance. Similarly, when businesses invest in capital goods like machinery and equipment, they increase their production capacity and hire more workers to meet output targets. Over time, this process reduces the rate of unemployment and stimulates broader economic growth (Levine & Renelt, 2022). Bakare (2011) emphasized that an increase in gross capital formation leads to a rise in employment, particularly in sectors like manufacturing, services, and agriculture, which are labour-intensive and vital to Nigeria's economic diversification. In addition to physical capital, capital formation in human capital—such as education, training, and health—also positively influences employment outcomes. A skilled and healthy workforce attracts investment and increases the employability of individuals, aligning labour supply with the needs of a growing economy. As human capital improves, individuals can more easily find and retain jobs, leading to a decline in structural unemployment. The combined effect of physical and human capital formation, when well-managed and inclusive, not only boosts productivity and industrial output but also provides sustainable employment opportunities for the growing Nigerian labour force (Foster & Briceno-Garmendia, 2020). Therefore, capital formation serves as a foundational pillar in the quest to reduce unemployment and promote long-term economic development in Nigeria. Drawing from the foregoing therefore, this study sought to determine the effect of capital formation on unemployment in Nigeria.

Statement of the Problem

The government of Nigeria began its structural adjustment programme (SAP) in 1986, which placed more value on the private sector and less on the public sector. Improving economic growth and lowering the unemployment rate were the intended outcomes of encouraging private domestic savings and private domestic investment for capital formation. It is believed that financial services, such as the credit creation and the mobilisation of savings and deposits, contribute to the

accumulation of capital, which should boost economic development. However, capital formation in Nigeria has been characterized by fluctuations which may be responsible for lack of or inadequate social infrastructure such as roads, power supply and health facilities. The speed and the strength of economic growth in Nigeria have not been satisfactory which contributes equally to the decline in capital formation over time. Consequently, it has often been unsteady, low and negative, resulting in capacity under-utilization, unemployment and its attendant high dependency ratio, low level output and sluggish economic growth, leading to escalated poverty problem in Nigeria. Consequently, unemployment rate has continued to be on the increase in Nigeria and controlling it has been one of the major challenges of successive governments in Nigeria. This is ironic considering the abundant resources (human and natural) available in Nigeria. The unemployment situation in Nigeria has indeed assumed a crisis dimension. Records from the World Bank Index in 2024 showed that over 50 million Nigerians are either unemployed or underemployed. The data further revealed that over 90 universities in Nigeria produce thousands of graduates. This is a welcome development but they linger in the labour market without jobs. Drawing from the foregoing, this study sought to empirically examine the effect of capital formation on unemployment in Nigeria. More specifically, the research aimed to:

- i. Determine the effect of gross fixed capital formation on unemployment rate in Nigeria
- ii. Examine the effect of net fixed capital formation on unemployment rate in Nigeria.
- iii. Ascertain the effect of national saving on unemployment rate in Nigeria.

LITERATURE REVIEW

Theoretical Framework

The Life Cycle Theory of Savings formed the basis of this research. In the 1950s, Franco Modigliani and Richard Brumberg put up the Life Cycle Theory of Savings, which states that people try to smooth out their consumption by planning their spending and saving behaviours over the course of their lives. People should put money aside while they are working and take money out when they retire, in congruence with this belief. That way, they can keep their level of life consistent. To put it another way, Modigliani and Brumberg (1950) came up with the Life-Cycle Theory in reaction to the idea that people's spending decisions are affected by the resources they have access to at any given time. An increasing proportion of the population should be conserving less money than an increasing proportion of the population that is actively looking for work, if this theory is to be believed. Put simply, individuals tend to put money aside while they are young and have little means, continue to do so while employed, and then put much more away once they reach retirement age. The life-cycle theory, in congruence with Nwachukwu and Egwaikhede (2007), is the main theory that saving habit study is based on. Income, rise in income, fiscal policy, terms of trade, interest rates, inflation, financial development, macroeconomic stability, and foreign debt are all elements that impact saving behaviours, in congruence with the Life-Cycle Theory. The Life-Cycle Theory provides a framework within which to examine each of these elements. The LCH is based on the accumulation of generations with limited lifespans that overlap. The central premise of the theory is that individuals would manage their finances prudently during their lifetimes until their bequests and savings reach the total of their lifetime earnings (Deaton, 1977).

Assumptions of the Life Cycle Theory of Savings

Among the key tenets of the Assumptions of the Life Cycle Theory of Savings of savings are:

- a. Individuals are rational and forward-looking, making consumption and savings decisions based on their lifetime income and expected needs. They aim to maximize their utility over the course of their lives by planning their consumption and savings in anticipation of different stages of life.
- b. People experience different income levels at different stages of their life. Typically, income is lower in the early years, peaks during the middle years (working years), and declines during retirement. The theory assumes that individuals save during their high-income years to fund consumption during their low-income years.
- c. Individuals prefer a stable consumption pattern over their lifetime rather than experiencing significant fluctuations. They achieve this by borrowing, saving, and dissaving at different stages of their life.
- d. Individuals have perfect foresight or very good estimates about their future income, life expectancy, and financial needs. This assumption allows them to plan accurately for future consumption and savings.
- e. The theory assumes that individuals can borrow freely against their future income. This means they can smooth consumption by borrowing when young and repaying the debt during their working years.

This theory is pertinent to our present research as it elucidates the relationship between a society's savings rate and the anticipated results of capital growth, which subsequently indicate the demographic age of the population. Consistent with this concept, individuals begin retirement savings throughout their employment and cease saving after reaching a certain age. These results contribute to the evidence that individuals from more developed nations tend to save a greater amount of money.

Conceptual Review

Capital Formation

The eminent economist John Maynard Keynes utilized the term "capital formation" to describe how nations raise their stock of capital by purchasing more productive machinery and buildings. He stressed that developing an economy's productive potential is dependent on capital development, which entails the production of physical assets. Investment, in congruent with Keynes, is the primary driver of capital formation; interest rates and expectations of future profitability are two of the many variables that impact investment. Also, Paul A. Samuelson, a Nobel laureate in economics, described capital formation as the net addition to the existing stock of capital assets. This process includes the creation of new factories, machinery, tools, and buildings. Generally capital formation refers to the process of increasing the stock of physical capital in an economy. In this sense, it refers to any method used in mobilising or utilising capital resources for investment purposes (Panshak & Shingil, 2016).

Determinants of Capital Formation in Nigeria

Kanu and Ozurumba (2014) stated that taxes, marketing boards, total national savings, public companies, foreign investment and assistance, and total national savings are the sources of capital formation in Nigeria. There has been a substantial retardation in economic growth due to the capability of these sources. Nweke, Odo and Anoke (2017) identified total national savings, surplus labour, population growth, foreign direct investment, interest rate, and government assets as the factors or elements that influence capital formation in Nigeria.

Classifications of Capital Formation in Nigeria

In line with Ugwuegbe and Uruakpa (2013), both private domestic investment and public domestic investment help a government create wealth. Public investments comprise investments made by the government and publicly traded companies. This is different from domestic investments, which comprise fixed capital growth and net changes in inventory levels. Investing in Nigeria is important for the economy to grow. This goes for both government and private companies. Adebayo and Ogunrinola (2020) claimed that building capital equipment on a large enough scale to boost productivity in industry, plantations, mining, and/or agriculture is one way to assess economic growth. Public works projects like roads, railroads, hospitals, and schools, as well as private sector endeavours like R&D and overall housing enhancement projects, all require financial backing (Jhingan, 2006). To recap, the essence of economic growth is all about producing social and economic overhead costs, which boosts national output and income by breaking the supply-and-demand vicious loops that keep people in poverty, increases employment, and so on.

Unemployment

Many scholars have offered their own unique takes on what unemployment is and how it is defined. In simpler terms, unemployment is the overall proportion of the population that is seeking job but is unable to find it. What this means is that there are a lot of individuals out there who are qualified for the jobs that are available, but there are not enough jobs for them to do. In congruence with Gbosi (2005), unemployment occurs when individuals who are ready and able to work at the going rate of pay cannot find employment. Aminu and Anono (2012) defined unemployment rate as the percentage of the population that is neither employed nor actively seeking employment while having the necessary skills and abilities to do the job. Consequently, being unemployed means that there is a general lack of work opportunities in the nation. Unemployment can be measured utilising this formula: $\text{Unemployment} = \frac{\text{number of unemployed people}}{\text{labour force}} \times 100$ ($\text{UR} = \text{UN}/\text{L} \times 100$) $\text{Labour force} = \text{No. of employed} + \text{No. of unemployed}$ ($\text{L} = \text{EM} + \text{UN}$).

Types of Unemployment

In Nigeria, there are several forms of unemployment. Some of them include the following:

Structural Unemployment: When a person's skills are inadequate to carry out the duties of their position, this is known as structural unemployment. Several factors contribute to structural unemployment, including but not limited to: technological displacement, inadequate knowledge

of demand composition, living in economically depressed areas, shifts in wage structure relative to demand pattern, and competition from imported goods vs domestic ones.

Frictional Unemployment: People are constantly moving from one job to another, which is known as frictional unemployment. It describes a circumstance in which an individual is looking for new employment after losing their current one. Frictional unemployment may be defined as the length of time a person remains unemployed. Regular employee turnover is a key factor in frictional unemployment.

Cyclical Unemployment: When there are shifts in the state of the economy, such as during a recession or a depression, it may lead to cyclical unemployment. The business cycle's contraction phase is the culprit. When consumer spending plummets, companies often have to lay off a lot of employees to stay afloat.

Seasonal Unemployment: The nature of the season determines the rate of seasonal unemployment. Depending on the time of year, the demand for certain occupations rises and falls, causing seasonal unemployment. Typically, seasonal unemployment is most prevalent during a certain season and ends during a different season.

Residual Unemployment: People with disabilities, whether mental or physical, often find themselves unemployed because they are unable to fully take advantage of the opportunities that do exist for them. This sort of unemployment is known as residual unemployment.

Empirical Review

Esomnofu and Onyejebu (2025) investigated the impact of capital formation on economic growth in Nigeria. The study employed the Ordinary Least Squares (OLS) technique. The empirical findings suggested that capital formation has a positive and significant impact on economic growth in Nigeria for the period under review. The result further showed a long-run relationship between capital formation and economic growth in Nigeria for the period under review

Omebere, Ezenekwe, Uzoechina and Nwokoye (2024) examined the impact of domestic investment and unemployment on economic growth in Nigeria for the period 1980 and 2022. The study employed the Autoregressive Distributed Lag (ARDL) bound test to determine the reliability of the models and results obtained. The findings revealed that gross fixed capital formation (GFCF) had a positive and significant impact on the economic growth in Nigeria, while unemployment had a negative and significant impact on the economic growth in Nigeria. of strategies that promote stability and pave the way for robust and sustainable economic growth.

Oyegun and Eleh (2023) examined the impact of capital formation on economic growth in Nigeria for the period of 1981 to 2022 using annual time series data on variables such as gross domestic product, gross fixed capital formation, total national savings and foreign direct investment. The findings show that gross fixed capital formation, and foreign direct investment have no significant effect on Nigeria's gross domestic while total national savings have a significant effect on gross domestic product in Nigeria.

Osunkwo (2021) examined capital formation and economic growth of Nigeria (1980-2017). The study discovered that Gross Fixed Capital Formation, and economic growth were stationary at second difference, Johansen co integration test was employed to determine the order of integration while error correction model was employed to determine the speed of adjustment to equilibrium. The empirical findings suggest that capital formation has significant negative impact on economic growth while interest rate has a negative impact on economic growth in Nigeria.

The effect of capital accumulation on economic growth in Nigeria was the primary subject of Onwiodioki and Otolorin's (2021). The researchers analysed yearly time series data from 1981–2018 using the Dynamic Ordinary Least Square (DOLS) method to derive results. The study found that GDP growth was severely and adversely impacted by gross fixed capital formation. Also, foreign debt and the overall labour force also served as growth inhibitors, according to the research.

Ajose and Oyedokun (2018) investigated the influence of capital accumulation on economic growth in Nigeria. The researchers advanced econometrics tests to ascertain the impact of capital formation and economic growth in Nigeria. Findings revealed that none of the models was stationary at level but were all stationary at first difference. The results also show that there is a long run significant relationship that exists between the variables examined and there is a causal relationship between capital formation and economic growth in Nigeria within the period under study. The result also revealed a negative non-significant relationship between economic growth and capital formation in Nigeria.

Adeleye (2018) examined the determinants affecting long-term capital formation through the Nigerian capital market. The study's twenty-five-year time frame was from 1990 to 2014. The Ordinary Least Squares approach is the econometric technique used (OLS). The results showed that the Nigerian economy was significantly but only marginally impacted by the stock market. Lack of a functioning stock market deprived the economy of long-term resources needed for long-term growth and development.

Nweke, Odo and Anoke (2017) examined the effect of capital formation on economic growth in Nigeria. The study adopted co integration and vector error correction model in the analysis of the variables specified in the model in addition to VEC granger causality test. The result of the data analyzed showed that gross capital formation (GCF) has a negative insignificant impact on real gross domestic product (RGDP) in the short run and the long run. Government capital expenditure (GCE) revealed negative significant correlation with RGDP (real gross domestic product) both in the short and long run.

Kanu and Ozurumba (2014) examined the impact of capital formation on the economic growth of Nigeria was studied using multiple regressions technique. It was ascertained that in the short run, gross fixed capital formation had no significant impact on economic growth; while in the long run; the VAR model estimate indicates that gross fixed capital formation, total exports and the lagged values of gross domestic product had negative long run relationships with economic growth in Nigeria. It was equally ascertained that there exists an inverse relationship between imports, total national savings and economic growth; while gross domestic product was seen to have a

unidirectional causal relationship with export, gross fixed capital formation, import and total national saving.

Ugwuegbe and Uruakpa (2013) investigated the impact of capital formation on economic growth in Nigeria. The data were collected from Central Bank of Nigeria statistical bulletin while Ordinary least square (OLS) technique was employed. To test for the properties of time series, Phillip-Perron test was used to determine the stationarity of the variables and it was discovered that gross fixed capital formation and economic growth are integrated of order zero (I(0)), Johansen co integration test was employed to determine the order of integration while error correction model was employed to determine the speed of adjustment to equilibrium. The empirical findings suggest that capital formation has negative and significant impact on economic growth in Nigeria for the period under review.

Literature Gap

Having theoretically and empirically reviewed related literature with respect to the effect of capital formation on unemployment in Nigeria, content, time and methodology gaps in knowledge have been identified and this study ultimately bridged these gaps. Contently, most of the related studies focused on capital formation – economic growth nexus while the effect of capital formation on unemployment in Nigeria has been understudied. As a result, this study empirically determined the effect of capital formation on unemployment in Nigeria. Secondly, none of the previous related studies covered most recent events (2024). As a result, this study will cover a period from 1985 to 2022 as this will make this study to be more current. Lastly, most of the studies did not carry out pre-estimation tests and post-estimation tests. Hence, this study will carry out pre-estimation tests and post-estimation tests for a better result.

METHODOLOGY

This study employed the ex post facto research methodology. The term "ex post facto research" refers to studies that use the experimental technique and other fundamental concepts of inquiry to examine and understand phenomena that have already occurred. In addition, this research made use of yearly time series data. Reports from the National Bureau of Statistics (NBS) and the World Bank Indicators (WDI) were the sources of the data used in this research. The data utilized to evaluate this research likewise extended across forty (40) years, from 1985 to 2024.

Model Specification

Life Cycle Theory of Savings provided the theoretical groundwork for this study's analytical approach. Oyegun and Eleh (2023) appraised the effect of capital production on economic development in Nigeria, and their model served as the empirical foundation for this research. But, in order to fit the study's variables and achieve its objectives, we modified the model of Oyegun and Eleh (2023). In light of the above, the research provides the following functional specification for the revised model:

$$UMR = f(GFCF, NFCF, NTS) \quad (3.1)$$

The mathematical representation of the functional relationship in equation 3.1 is as follows:

$$UMR = \delta_0 + \delta_1 GFCF + \delta_2 NFCF + \delta_3 NTS \quad (3.2)$$

In order to improve its estimation, the mathematical relationship in equation 3.2 is expressed in econometric form:

$$UMR = \delta_0 + \delta_1 GFCF + \delta_2 NFCF + \delta_3 NTS + u_t \quad (3.3)$$

The log-linear form of the econometric model mentioned above (3.3) is as follows:

$$\ln UMR = \delta_0 + \delta_1 \ln GFCF + \delta_2 \ln NFCF + \delta_3 \ln NTS + u_t \quad (3.4)$$

A Priori Expectation: $\delta_1 < 0$; $\delta_2 < 0$; $\delta_3 < 0$.

Where: UMR = Unemployment rate, $GFCF$ = Gross fixed capital formation, NNE = Net fixed capital formation, NTS = National saving, f = Function of, δ_0 = Regression Intercept, δ_1 = Parameter of gross fixed capital formation, δ_2 = Parameter of net fixed capital formation, δ_3 = Parameter of national saving, μ_t = Disturbance or error term

The long-run ARDL model is stated thus:

$$\begin{aligned} \Delta \ln(UMR_t) = & \delta_0 + \delta_{1i} \Delta \ln(UMR_{t-1}) + \delta_{2i} \Delta \ln(GFCF_{t-1}) + \delta_{3i} \Delta \ln(NFCF_{t-1}) \\ & + \delta_{4i} \Delta \ln(NTS_{t-1}) \\ & + \sum_{t=1}^p \alpha_{1i} \Delta \ln(UMR_{t-1}) + \sum_{t=1}^q \alpha_{2i} \Delta \ln(GFCF_{t-1}) + \sum_{t=1}^q \alpha_{3i} \Delta \ln(NFCF_{t-1}) \\ & + \sum_{t=1}^p \alpha_{4i} \Delta \ln(NTS_{t-1}) \\ & + \varepsilon_{1i} \end{aligned} \quad (3.5)$$

The short-run ARDL model is stated thus:

$$\begin{aligned} \Delta \ln(UMR_t) = & \alpha_0 + \sum_{t=1}^p \alpha_{1i} \Delta \ln(UMR_{t-1}) + \sum_{t=1}^q \alpha_{2i} \Delta \ln(GFCF_{t-1}) + \sum_{t=1}^q \alpha_{3i} \Delta \ln(NFCF_{t-1}) \\ & + \sum_{t=1}^p \alpha_{4i} \Delta \ln(NTS_{t-1}) + \lambda ECM_{t-1} \\ & + U\varepsilon_i \end{aligned} \quad (3.6)$$

Where: δ_0 = Constant variable, $\delta_1 - \delta_4$ = Long-run Coefficients/Parameters, $\alpha_1 - \alpha_4$ = Coefficients/parameters, \ln = Natural log, Δ = Difference operator and indicates the optimum, ECM = Lagged error correction term obtained from the estimated cointegration model, λ = Speed of adjustment which is expected to be less than zero. $U\varepsilon_i$ = Error term

Variable Description

In practical terms, the variables used for this research are either dependent (explained) or independent (explanatory) variables: The unemployment rate serves as a surrogate for the dependent variable, which is unemployment, in this research. However, capital formation serves as the independent variable, and its proxies are gross fixed capital formation, net fixed capital formation, and net national saving:

Dependent Variables

Unemployment Rate: By dividing the total number of people out of work by the total number of people actively seeking employment, we may get a sense of the unemployment rate's prevalence as a percentage.

Independent Variables

Gross fixed capital formation, net capital formation, and national saving are used as proxies of capital formation (independent variable) because they capture investment volume, actual capital stock increase, and domestic funding capacity—all essential for employment generation.

a. Gross Fixed Capital Formation: This is the sum of all investments in fixed capital assets that the Nigerian economy makes in a certain time frame, usually a year. Spending in long-lasting assets like machinery, equipment, buildings, and infrastructure helps boost the Nigerian economy's ability to produce products and services.

b. Net Fixed Capital Formation: This shows how the Nigerian economy's stock of fixed capital assets changed during a certain time, after taking depreciation or wear and tear of existing assets into consideration. To get Net Fixed Capital Formation, we take Gross Fixed Capital Formation (GFCF) and remove depreciation from it. This gives us a net rise to the capital stock of the economy for that time.

c. National Saving: This is the amount of money Nigeria saves after deducting the costs of fixed capital consumption and changes to its net foreign assets. Nigeria's saving rate is its rate of domestic capital generation and accumulation. National saving is a measure of a Nigeria's ability to fund investment at home and maintain economic development over time since it considers both domestic saving and net inflows or outflows of foreign capital.”

Data Analysis Technique

To assess the dynamic effect of capital formation on unemployment in Nigeria, this research utilized the Autoregressive Distributed Lag (ARDL) technique. This is because the unit root test result shows mixed of $I(0)$ and $I(1)$. In furtherance, post-estimation tests were carried out as these are essential to validate the robustness, reliability, and credibility of the estimated model. They help confirm whether the assumptions underpinning the regression model hold true and whether the results are statistically sound.

DATA ANALYSIS AND RESULTS

Descriptive Statistical Analysis

Table 4.1 presents the descriptive statistics of the data for this study as follows:

Table 4.1: Descriptive Statistics

	UMR_t	$GFCF_t$	$NFCF_t$	NTS_t
Mean	4.895128	13568.31	6593.605	2286.946
Median	3.780000	5772.640	5954.140	1649.630
Maximum	10.10000	71055.79	16649.57	6656.810
Minimum	1.900000	108.8700	1958.690	224.3700
Std. Dev.	2.185954	20070.49	3436.511	2089.938
Skewness	1.120760	1.877194	0.933117	0.322636
Kurtosis	2.882966	5.269370	3.443893	1.549197
Jarque-Bera	8.186921	31.27390	5.979794	4.096962
Probability	0.016681	0.000000	0.050293	0.128931
Sum	190.9100	529164.3	257150.6	89190.91
Sum Sq. Dev.	181.5790	1.53E+10	4.49E+08	1.66E+08
Observations	39	39	39	39

Source: Authors' Computation, 2025.

From 1986 to 2024, the average unemployment rate is 4.90, as shown in Table 4.1. The maximum value for unemployment rate is 10.1 while the minimum value of unemployment rate is 1.9. In furtherance, the average gross fixed capital formation is 13568.31. The maximum value for gross fixed capital formation is 71055.79 while the minimum value of gross fixed capital formation is 108.87. Moreover, the average net fixed capital formation is 6593.61. The maximum value for net fixed capital formation is 16649.57 while the minimum value of net fixed capital formation is 1958.69. Lastly, the average national saving is 2286.94. The maximum value for national saving is 6656.81 while the minimum value of national saving is 224.37.

Unit Root Test

The Augmented Dickey-Fuller (ADF) statistic was utilized in the series as a stationarity test to rule out false regression. Table 4.2 below displays the results of the ADF unit root test:

Table 4.2: Augmented Dickey-Fuller (ADF) Test Results

Variables	Levels	Augmented Dickey-Fuller (ADF)			I(d)	Decision
		5% Critical	1 st	5%		
		Value	Difference	Critical		
				Value		
$InUMR_t$	-1.205026	-2.941145	-6.094494	-	I(1)	Stationary @ 1 st
				2.943427		Difference
$InGFCF_t$	-1.833645	-2.941145	-4.547447	-	I(1)	Stationary @ 1 st
				2.943427		Difference
$InNFCF_t$	-6.539503	-2.941145	-	-	I(0)	Stationary @ Level
$InNTS_t$	-0.769947	-2.941145	-6.431260	-	I(1)	Stationary @ 1 st
				2.943427		Difference

Source: Authors' Computation, 2025.

The ADF unit root test results for net fixed capital formation (NFCF) at level allow us to reject the null hypothesis of unit root, as shown in Table 4.2. This means that NFCF is zero-order integrated and stationary at level, denoted as [I(0)]. However, when looking at the unemployment rate (UMR), gross fixed capital formation (GFCF), and national saving (NTS) at all levels, it is not possible to reject the null hypothesis of unit root. This means that the UMR, GFCF, and NTS all have contained unit roots at levels. Nevertheless, by comparing the UMR, GFCF, and NTS at first difference, we may reject the null hypothesis of a unit root. As a result, the UMR, GFCF, and NTS are all integrated of order one, or [I(1)], and they are all stationary at first difference. In congruent with the unit root test, there should not be any misleading or erroneous regression estimates in the data. Since there is a mixture of I(0) and I(1) variables, indicating mixed stationarity, co-integration analysis is warranted.

Bounds Cointegration Test

Using the ARDL Bound test, we can determine if the variables in the equation have a long-run cointegrating relationship or not, given that they have mixed stationarity. That is, they are integrated of order zero [I(0)] and integrated of order one [I(1)]. As shown in Table 4.3, the ARDL bounds cointegration test yielded the following results:

Table 4.3: Bounds Cointegration Test Results

Substantial Level	Critical Value Bound		F-Statistics	K
	I(0) Bound	I(1) Bound		
10 Percent	2.37	3.2	5.777702	3
5 Percent	2.79	3.67		
2.5 Percent	3.15	4.08		
1 Percent	3.65	4.66		

Source: Authors' Computation, 2025.

The results of the ARDL bound cointegration test, as shown in Table 4.3, provide evidence of model-wide cointegration and the rejection of the null hypothesis. The F-statistic value of 5.777702 is higher than both the upper bound critical value and the lower bound critical value at 5%. The Bounds test also shows that gross fixed capital formation, net fixed capital formation, national saving, and unemployment rate are all related or cointegrated over the long term. This implies that national saving, gross fixed capital formation, and net fixed capital formation are all strong long-term predictors of the unemployment rate. Therefore, we estimated our ARDL model after detecting cointegrating correlations in the model.

Estimation of Autoregressive Distributed Lag (ARDL) Model

Below in Table 4.4, you can see the results of the ARDL Model estimate for both the long run and the short run:

Table 4.4: ARDL Long-Run and Short-Run Estimation Results

Dependent Variable = $\ln UMR_t$				
ARDL Long-Run Results				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
$\ln GFCF_t$	-0.224578	0.064667	-3.472844	0.0019
$\ln NFCF_t$	-0.712395	0.177155	-4.021318	0.0005
$\ln NTS_t$	-0.158989	0.096803	-1.642387	0.1130
C	4.574570	1.247835	3.666006	0.0012
EC = LOG(UMR) - (-0.2246*LOG(GFCF) -0.7124*LOG(NFCF) -0.1590*LOG(NTS) + 4.5746)				
ARDL Short-Run Results				
$D(\ln UMR_t)$	0.248613	0.150479	1.652151	0.1110
$D(\ln GFCF_t)$	-0.252441	0.101063	-2.497843	0.0178
$D(\ln GFCF_{t-1})$	0.595167	0.318557	1.868324	0.0709
$D(\ln NFCF_t)$	0.282055	0.113578	2.483355	0.0201
$D(\ln NFCF_{t-1})$	0.242836	0.083727	2.900323	0.0077
$D(\ln NFCF_{t-2})$	0.216384	0.137287	1.576147	0.1248
$D(\ln NTS_t)$	-0.033548	0.078616	-0.426732	0.6732
CointEq(-1)*	-0.538594	0.134185	-4.013810	0.0005
Adjusted R ²	0.558103			
Durbin-Watson stat	2.074216			

Source: Authors' Computation, 2025.

Interpretation of Long-Run and Short-Run ARDL Parameters

The results of the long-run estimates of the ARDL model as shown in Table 4.4 shows that gross fixed capital formation has a negative (-0.224578) and significant ($0.0019 < 0.05$) effect on

unemployment rate in Nigeria in the long-run while the results of the short-run estimates of the ARDL model as shown in Table 4.4 equally shows that gross fixed capital formation has a negative (-0.252441) and significant ($0.0178 < 0.05$) effect on unemployment rate in Nigeria in the short-run. The implication of this is that unemployment rate will significantly reduce in both long-run and short run given a unit increase in gross fixed capital formation.

Also, the results of the long-run estimates of the ARDL model as shown in Table 4.4 shows that net fixed capital formation has a negative (-0.712395) and significant ($0.0005 < 0.05$) effect on unemployment rate in Nigeria in the long-run while the results of the short-run estimates of the ARDL model as shown in Table 4.4 also shows that net fixed capital formation has a negative (-0.282055) and significant ($0.0201 < 0.05$) effect on unemployment rate in Nigeria in the short-run. The implication of this is that unemployment rate will significantly reduce in both long-run and short run given a unit increase in net fixed capital formation.

Additionally, the results of the long-run estimates of the ARDL model as shown in Table 4.4 shows that national saving has a negative (-0.158989) and non-significant ($0.1130 > 0.05$) effect on unemployment rate in Nigeria in the long-run while the results of the short-run estimates of the ARDL model as shown in Table 4.4 equally shows that national saving has a negative (-0.033548) and non-significant ($0.6732 > 0.05$) effect on unemployment rate in Nigeria in the short-run. The implication of this is that the unemployment rate will insignificantly reduce in both the long run and the short run given a unit increase in national savings.

Interpretation of CointEq(-1) Result

Table 4.4 displays the results of the error correction model, which indicate that the error term is substantial ($0.0005 < 0.05$) and negative (-0.538594). In particular, the error term coefficient of -0.538594 indicates that there is rapid adjustment towards long run equilibrium (i.e., that changes in the unemployment rate correct almost 54% of the disequilibrium each year). The long-run equilibrium should be able to readily return to its steady state, even in the face of a shock. Furthermore, the error term's small coefficient value suggests that restoring the steady-state relation after a system distortion would require an extremely long period.

Interpretation of Adjusted R-Squared (Adj. R²) Value

Table 4.4 shows the short-run estimates of the ARDL model, and the estimated model is well-fit, with an Adjusted R-squared value of 0.558103. This is because the explanatory variables, which comprise national saving, gross fixed capital formation, and net fixed capital formation, accounted for around 56% of the variation in the unemployment rate, while other variables outside the model accounted for the remaining 44%.

Post-Estimation Tests

The results of the post-estimation tests are presented in Table 4.5:

Table 4.5: Post-Estimation Test Results

Test	Test Type	X ² Value	X ² Prob	Decision
Normality Test	Jarque-Bera Test	0.927136	0.741524	Do not Reject H ₀
Serial Correlation Test	Breusch-Godfrey LM Test	0.703709	0.5051	Do not Reject H ₀
Heteroscedasticity Test	Breusch-Pagan-Godfrey	0.598463	0.7861	Do not Reject H ₀
Functional Form Test	Ramsey RESET	0.150654	0.7013	Do not Reject H ₀

SSource: Authors' Computation, 2025.

Table 4.5 displays the outcome of the Jarque Bera (Normality) test, which indicates that the model follows a normal distribution. The model is free of serial correlation issues, in congruent with the Breusch-Godfrey Serial Correlation LM test. Moreover, the outcome of the Breusch-Pagan-Godfrey heteroskedasticity test suggests that relevant factors were not absent. Last but not least, the model is defined appropriately in congruent with the Ramsey RESET test. This proves the model's functional form is accurate.

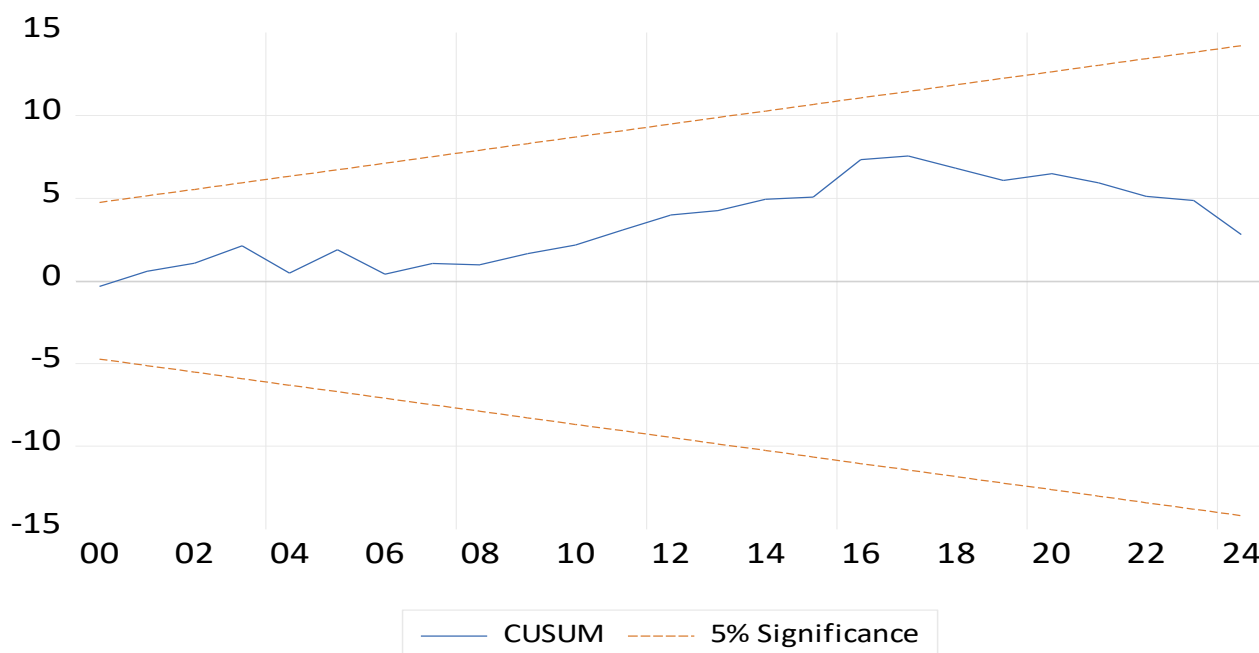


Figure 4.1: Stability Cusum Tests

Source: Authors' Computation, 2025.

Results from the stability tests showed that the CUSUM line stayed within the 5% critical limit, as shown in Figure 4.1. Because the CUSUM plot stayed below the 5% crucial lines, we may conclude that the regressors' long-term coefficients on unemployment in Nigeria are stable. As a result, the model's predictions regarding the influence of capital production on Nigeria's unemployment rate serve as evidence of parameter stability. In conclusion, the post-estimation test results demonstrated that the variables in our model—namely, the unemployment rate, gross fixed capital formation, net fixed capital formation, and national saving—are in accordance with the fundamental assumptions of OLS estimation.

DISCUSSION OF FINDINGS

The primary goal of this research is to analyse the relationship between capital formation and unemployment in Nigeria from 1986 to 2024. Gross fixed capital formation is negatively and substantially correlated with Nigeria's unemployment rate, both in the short and long term, in congruent with this study's results. It follows that, both immediately and over the long term, Nigeria's unemployment rate would go down if the country's gross fixed capital formation goes up. The results of Ajose and Oyedokun (2018) corroborate these results; he discovered that gross fixed capital formation is a key component of capital formation, which in turn decreases economic growth in Nigeria within the period under study. On the other hand, Omebere, Ezenekwe, Uzoechina and Nwokoye (2024) found that gross fixed capital formation (GFCF) has a positive and significant impact on the economic growth in Nigeria. In addition, the analysis found that both the short- and long-term relationships between Nigeria's unemployment rate and net fixed capital formation are negative and statistically substantial. It follows that, both immediately and over the long term, Nigeria's unemployment rate will go down if net fixed capital formation goes up. In a comparable vein, Esomnofu and Onyejegbu (2025) found capital formation component in terms of net fixed capital formation to have a significant impact on economic growth in Nigeria for the period under review.

Finally, this study's results showed that, over the short-term and long term, national saving and the unemployment rate in Nigeria had a negative and non-substantial association. This suggests that, in the short-term and long term, Nigeria's unemployment rate would go down if the country's savings rate goes up. These results are in line with those of Oyegun and Eleh (2023), who discovered that total national savings has a significant effect on Gross Domestic Product in Nigeria.

Conclusion and Recommendations

This study established that national saving, gross fixed capital formation, and net fixed capital formation all had a negative impact on Nigeria's unemployment rate. This indicates that the unemployment rate in Nigeria will decrease given an increase in national saving, gross fixed capital formation, and net fixed capital formation. Hence, the government should prioritise and increase investments in key infrastructure projects such as transportation networks (roads, railways, ports), energy generation (power plants), and industrial zones. These investments should focus on high-impact areas that create significant employment opportunities and stimulate

economic activities. Public-private partnerships (PPPs) could be utilised to attract private investment and expertise.

This study has contributed to the existing literature by empirically examining the dynamic relationship between capital formation and unemployment in Nigeria from 1985 to 2024 using the Autoregressive Distributed Lag (ARDL) approach. Unlike previous studies that often focused solely on gross capital formation, this research incorporates gross capital formation, net capital formation, and national saving, thereby offering a more comprehensive measure of capital accumulation. The ARDL method allows for distinguishing between short-run and long-run effects, revealing how capital formation influences unemployment over different time horizons. However, the study did not account for the informal employment sector, which constitutes a significant portion of Nigeria's labour market. Excluding informal employment may limit the completeness of the unemployment dynamics captured by the model. Therefore, future studies should investigate the effect of capital formation on informal employment, particularly in urban and semi-urban settings where informal labour is prevalent. Additionally, researchers can explore regional variations by using disaggregated state-level data to understand how capital formation affects unemployment differently across Nigeria's six geopolitical zones.

REFERENCES

- Adebayo, A. A., & Ogunrinola, I. O. (2020). Capital formation and unemployment in Nigeria: An econometric analysis. *Journal of Economics and Sustainable Development*, 11(15), 23–32.
- Adeleye, S. T. (2018). Capital formation in the Nigerian capital market and its effect on economic growth. *IIARD International Journal of Economics and Business Management*, 4(2), 16–23.
- Ajose, K., & Oyedokun, G. E. (2018). Capital formation and economic growth in Nigeria. *In: Accounting and Taxation Review*, 2(2), 131 - 142.
- Aminu, U., & Anono, D. (2012). An empirical investigation into the effect of unemployment and inflation on the growth in Nigerian. *Inter-disciplinary Journal of Research in Business*, 2(12), 30-44.
- Bakare, A. S. (2011). The determinants of capital formation in Nigeria: An error correction model. *Research Journal of Finance and Accounting*, 2(2), 36–44.
- Barro, R. J. (2021). Human capital and growth. *American Economic Review*, 91(2), 12–17.
- Deaton, A. (1977). Involuntary savings through unanticipated inflation. *American Economic Review*, 67(1), 800-910.
- Esomnofu, C. I., & Onyejebu, V. (2025). Impact of capital formation on nigeria economic growth: An econometric analysis. *Journal Islamic Economic Minangkabau*, 3(1), 1-11.

- Foster, V. & Briceno-Garmendia, C. (2020). *Africa's Infrastructure: A Time for Transformation*. Agence Française de Développement and World Bank.
- Gbosi, A. N. (2005). *Contemporary Macroeconomic Problems and Stabilization Policies*. Port Harcourt: Automatic Ventures.
- Jhingan, M. L. (2006). *Economic development*. New Delhi, Vrinda Publications (P) Ltd, p.162.
- Jhingan, M. L. (2016). *The economics of development and planning* (40th ed.). Vrinda Publications.
- Kanu, S. I. & Ozurumba, B. A. (2014). Capital formation and economic growth in Nigeria. *Global Journal of Human-Social Science: Economics*, 14(4), 87-92.
- Levine, R., and Renelt, D. (2022). A sensitivity analysis of cross-country growth regressions. *American Economic Review*, 82(4), 942–963.
- Modigliani, F., & Brumberg, R. (1950). *The life-cycle theory in Deaton A.* (ed) Princeton University.
- Nwachukwu, T. E. & Egwaikhide, F. O. (2007). *An error-correction model of the determinants of private saving in Nigeria*. A paper presented at the African Economic Society (AES) Conference, Cape Town, South Africa.
- Nweke, G. O., Odo, S. I. & Anoke, C. I. (2017). Effect of capital formation on economic growth in Nigeria. *Asian Journal of Economics, Business and Accounting*, 5(1), 1-16.
- Ogbuji, A. I., Oke, B. O. & Adegbite, E. O. (2021). The growth impact of capital formation and financial markets in Nigeria. *Unilag Journal of Business*, 7(1), 134-148.
- Omebere, H. I., Ezenekwe, U. R., Uzoechina, B. I., & Nwokoye, E. S. (2024). Impact of domestic investment and unemployment on Nigeria's economic growth. *Journal of Economic Studies (JES)*, 21(2), 46 - 62
- Onwiodiokit, E. A., & Otolorin, G. F. (2021). Capital formation and economic growth in Nigeria: an empirical re-examination. *CBN Bullion*, 45(2), 58 – 72.
- Osunkwo, F. O. (2021). Capital formation and economic growth of Nigeria (1980-2017). *International Research Journal of Advanced Engineering and Science*, 6(2), 6-8.
- Oyegun G., & Eleh, C. (2023). The impact of capital formation on economic growth in Nigeria. *Middle European Scientific Bulletin*, 34(4), 1-10.

- Panshak, Y., & Shingil, M. E. (2016). Capital market liquidity and economic growth in Nigeria: An Autoregressive Distributed Lag (ARDL) Approach. *Journal of Economics and Finance (IOSR-JEF)*, 7(6), 08-16.
- Sunusi, Y. E., & Ahmad, M. T. (2017). An analytical study of the impact of unemployment on economic growth in Nigeria (1970-2016). *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 22(7), 74-81.
- Ugwuegbe, S. U. & Uruakpa, P. C. (2013). The impact of capital formation on the growth of Nigerian Economy. *Research Journal of Finance and Accounting*, 4(9), 36-42.
- World Bank. (2024). Poverty and Shared Prosperity 2018: Piecing Together the Poverty Puzzle. Washington, DC: World Bank.